Amendments to the Specification

Paragraph at page 2, lines 22-29:

Superior results are obtained if the legs 12 are machined from virgin polysilicon, which is silicon formed by chemical vapor deposition from a gaseous precursor, typically silane (SiH_4) or a chlorosilane ($SiClH_3$, $SiCl_2H_2$, $SiCl_3H$, or $SiCl_4$). Virgin polysilicon (virgin poly) is the precursor material used for the Czochralski growth of silicon ingots from which wafers are cut. It has an exceedingly low level of impurities. Although virgin poly would be the preferred material for the bases 14, it is not usually available in such large sizes. Instead, Czochralski or cast silicon may be used for the bases. Their higher impurity level is of lesser importance since the bases 14 do not contact the wafers 22.

Four paragraphs at page 8, line 5 to page 9, line 6:

A spin-on glass, ~~FOx 17~~ FOx® 17 spin-on glass available from Dow Chemical, contains about 22% solid. It was mixed with milled virgin polysilicon powder and the mixture was coated on unoxidized silicon test samples. The bond was good. However, the mixture set up within a few minutes at room temperature (22°C), far too quickly for use in assembling silicon towers which require careful jigging in the annealing furnace to achieve proper alignment of the parts.

Example 2

Pine oil was used as a retardant to slow the initial setting. Pine oil is commercially available from Hercules as Yarmor® 302 Pine Oil. It contains at least 85% terpene alcohols and very little water. It is soluble in organic solvents but much less soluble in water. The water content is less than 1% by volume. A 50:50 mixture of FOx 17 spin-on glass and pine oil was prepared. The mixture was combined with the milled silicon powder and applied to the area of the joint between unoxidized silicon test samples. It set up in about 2 to 3 hours, a satisfactory time for assembly. When annealed at 1200°C for four hours, it produced a bond that was stronger than the silicon structural member. A somewhat higher annealing temperature of at least 1300°C is preferred. A typical annealing sequence is a 6-hour ramp up, a 3-hour hold, and a 3-

hour ramp down. Both the spin-on glass liquid and the milled virgin poly powder need to be fairly fresh.

Example 3

Another spin-on glass, Honeywell 512B spin-on glass, typically used in semiconductor fabrication, was substituted for the FOx 17 spin-on glass in the previous example. Similar results were obtained although the 512B sets up more quickly than the FOx 17 spin-on glass.

Example 4

Terpineol is a terpene alcohol which is a pure form of pine oil having three isomeric forms of chemical composition $C_{10}H_{17}OH$. Terpineol 318 Prime Terpene Alcohol is available from Hercules with 98% tertiary alcohol content and less than 0.6% moisture. Its heavy metal impurities are believed is less than about 1 ppm. A colloidal sol was prepared in the ratio of 1:0.5:3 parts by weight of FOx 17 spin-on glass SOG precursor, terpineol, and milled silicon powder respectively. This mixture is expected to produce a cured composite of 7½% silica and 92½% silicon. The mixture was applied to silicon test samples, which were joined and then annealed. The annealing sequence in one experiment included a ramp up to about 1000°C and then an uncontrolled cooling. Nonetheless, the test samples were firmly bonded by the shorter, lower-temperature anneal.

Paragraph at page 10, line 25 to page 11, line 1:

The nano-silicon was substituted for the milled silicon powder in one of the above mentioned recipes with recipe of 3:1:1 of [[Fox]] FOx 17 spin-on glass, silicon powder, and terpineol by weight. The strength tests indicated a significantly stronger bond than using milled silicon. The adhesive also seemed to take somewhat longer to set up at room temperature and to cure at a lower annealing temperature. The joints, when broken, showed a whitish-grey color different from the blacker color when the milled silicon powder was used.

Two Paragraphs at page 11, lines 11-22:

In view of the positive trend with using nano-silicon powder, another series of tests [[were]] was performed using a recipe of 3:1 of FOx and nano-silicon powder, that is, no

terpineol or other retardant. The adhesive was observed to set up in about 15 minutes, significantly more than the 5 minutes with milled silicon powder without a retardant. The 15 minute setting time is considered sufficient to assemble and align a structure. The adhesive was annealed at 1100°C in air for between 15 and 20 hours. The final composition of the cured adhesive is estimated to be 60% silicon and 40% SiO_2 by weight although the local chemical composition at this time is not clear.

Six test structures were fabricated and tested for joint strength. Five of the structures included pairs of virgin polysilicon bars or rectangular rods. The break strengths were measured at 170, 374, 417, 561, and 714 lb/cm respectively. The rod ends at the fractured joints were inspected. All five virgin poly structures [[show]] showed a fairly uniform and smooth grey surface with perhaps some chip-like areas at the corner indicating cleavage of the underlying silicon rather than of the bond. The weakest structure was observed to contain a protrusion matching a corresponding feature across the joint and having a size of perhaps a hundred microns. It is believed that the protrusion prevented the otherwise smooth surfaces from being joined in close proximity. That is, the adhesive was excessively thick in this case. The sixth test structure included one virgin polysilicon rod and one crystalline Czochralski rod. The break strength was 680 lb/cm. The broken joint indicated that the underlying crystalline material broke on Czochralski cleavage planes, and that the adhesive did not break.